

Add new claims 27-29 as follows:

27. (New) The desalination process according to claim 1 or 14, wherein the ion selective membrane is operated at a variable pressure as a function of the cost of electricity to form the softened water that is blended in variable proportions with the second stream to increase the operating temperature of the desalination system and increase the recovery of potable water.

28. (New) The desalination process of claim 1 or 24, wherein the first stream of water is selected from the group consisting of salt water, seawater, brackish water, waste water and impaired water.

29. (New) The desalination process of claim 28, wherein the impaired water contains soluble salts having an ionic content of hardness ions in excess of 1,500 mg/liter.

REMARKS

I. Amendments

Figure 1 and Figure 2 have been amended to illustrate the principle of "blending" as contemplated by the claimed invention.

Amended Figure 1 illustrates the broad concept of the invention wherein a stream of softened water is blended with a second stream of water containing a higher concentration of hardness ions to form a feed to a desalination system. Amended Figure 1 also more clearly depicts the embodiment wherein intake seawater is blended with softened water resulting from nanofiltration treatment. Amended Figure 1 is supported by the original disclosure, including but

not limited to, page 3, lines 19-24; page 7, lines 1-6 and 15-26; page 8, lines 1-13; and Figure 3. The amendments to original Figure 1 are outlined in red. Substitution of original Figure 1 with amended Figure 1 is respectfully requested.

Amended Figure 2 shows that seawater, after passing through the reject section, is split into two streams: a first stream flowing through deaeration pretreatment and nanofiltration to become a stream of softened water, and a second stream of unsoftened water that is blended with the first stream of softened water to become a feed to multistage flash distillation plant. Amended Figure 2 is supported by the original disclosure, including but not limited to, page 8, lines 1-13; page 9, lines 23-32 and Figure 3. The amendments to original Figure 2 are outlined in red. Substitution of original Figure 2 with amended Figure 2 is respectfully requested.

The title of the application and claims 1, 2, 9, 10, 12-16 and 24-26 have been amended to more clearly describe the invention. Specifically, amended independent claims 1 and 24 recite that a first stream of softened water is blended with a second stream of water having a higher concentration of hardness ions than the softened water. Support is found on page 3, lines 1-3 of the specification. Moreover, amended claims 1 and 24 provide that the claimed invention is not limited to the desalination of "salt water". Rather, the invention relates to a water purification process according to which different streams of water having relatively higher and lower degrees of hardness are blended to form a variable make-up to a desalination unit. Support is found on page 2, lines 27-32.

As broadly disclosed on page 2, lines 31-32, the claimed invention contemplates the desalination of water containing soluble salts having an ionic content of hardness ions in excess of 1,500 mg/liter. Accordingly, new claims 28 and 29 have been added to provide that the first stream of water is selected from the group consisting of salt water, sea water, brackish water,

waste water and impaired water containing soluble salts having an ionic content of hardness ions in excess of 1,500 mg/liter. New claim 27 is directed to the embodiment of canceled claim 19.

No new matter has been introduced by any of the amendments to the claims or the specification.

II. The Claimed Invention

One embodiment of the claimed invention is directed to a water purification process characterized by the strategic use of ion selective membranes to form a variable make-up that is fed to a desalination unit to produce a water product of potable quality. The variable make-up is formed by blending a first stream of softened water with a second stream of water having a higher concentration of hardness ions than the stream of softened water. To form the softened water, a first stream containing a high concentration of hardness ions may be passed through an ion selective membrane to produce a water product having a reduced content of hardness ions.

Thus, the blending of different streams of water of relatively higher and lower degrees of hardness to form a variable feed is fundamental to the claimed desalination process. Moreover, this blending step is a patentably distinguishing feature. Advantageously, higher top operating temperatures and increased yields of potable water are possible by using a feed comprising variable proportions of a first stream of softened water and a second stream of water having a concentration of hardness ions than the softened water.

III. The Drawings

The drawings are objected to because Figures 1 and 2 allegedly do not clearly show the mixing of the softened water with the untreated water. As discussed in Section I, above, Figures

1 and 2 have been amended to more clearly illustrate the principle of “blending” as contemplated by the claimed invention. Specifically, amended Figures 1 and 2 show that the intake seawater is blended with softened water resulting from nanofiltration treatment. Applicant submits that amended Figures 1 and 2 are supported by the disclosure of the original description as discussed in Section I, above.

Withdrawal of the objection is requested.

IV. Claim Objection - 37 C.F.R. §1.75(c)

Claims 11 and 23 are objected to under 37 C.F.R. §1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. Claim 23 has been canceled. Applicant respectfully submits that claim 11 is *proper* form and refers to the preceding claims in the alternative. Claim 11 corresponds to the examples of acceptable multiple dependent claim wording as shown in Section A of M.P.E.P. §608.01(n). Withdrawal of the objection is requested.

V. Claim Rejections - 35 U.S.C. §112

Claim 1 is rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Specifically, the Examiner alleges that the expression “desalination system”, as recited in claim 1, is unclear. It is the Examiner’s opinion that a desalination system can only be membranes in a series, etc.

The Examiner’s attention is directed to the specification at page 3, lines 4-6, where it is stated that a desalination system, as contemplated by the present application, “may be one or more

desalination processes including reverse osmosis (“RO”), multistage flash distillation (MSF”), multieffect distillation (“MED”) and vapor compression [distillation]” (“VCD). Figures 1 and 2 present diagrammatic views of desalination systems embodying features of the claimed invention. Accordingly, it is submitted that the expression “desalination system”, as used in the claims, is intended to describe a system employing desalination technologies, e.g., RO, MSF, MED and VCD. All of these desalination processes and technologies have been described extensively in the art.

The test for definiteness under 35 U.S.C. §112, second paragraph, is whether one skilled in the art would understand the language in the claims when they are read in the light of the specification. In view of the specification, figures and relevant prior art, there is no doubt that the person of ordinary skill in the art would understand the meaning of the expression “desalination system”, as that expression is used in the claims. Moreover, the rejection under §112, second paragraph, is not warranted simply because the Examiner may be dissatisfied with the claim language. In the regard, the Examiner’s attention is directed to M.P.E.P. §2173.02 where is stated: “Some latitude in the manner of expression and the aptness of terms should be permitted even though the claim language is not as precise as the examiner might desire.”

For all of the foregoing reasons, it is submitted that the expression “desalination system”, as used in the claims, when read in view of the specification reasonably apprises those skilled in the art of the utilization and scope of the claimed invention. Withdrawal of the rejection respectfully requested.

VI. Claim Rejections - 35 U.S.C. §103

Claims 1-3, 5, 8 and 11-26 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over JP 9131260 (JP). Claims 1-22 and 24-26 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over JP 9131260 (JP) in view of Applicant's admissions.

The cited JP reference discloses passing sea water through a nanofiltration film to lower the density of sulfate (SO_4^{2+}) ion and then passing the treated water through a RO membrane. In accordance with the JP reference, 100% of the feed is subjected to a nanofiltration pretreatment prior to being fed to a desalination unit. There is no disclosure or suggestion of blending different streams of water of relatively higher and lower degrees of softness to form a variable feed to a desalination unit. Nor is there any suggestion of the advantages of using such a variable feed to increase the top operating temperature of the system and use a variable pressure to increase the recovery of potable water.

Accordingly, the obviousness rejection is based upon a hindsight reconstruction of Applicant's invention. At the time the claimed invention was made, the prior art including the cited JP reference did not teach or suggest the blending principle as set forth in the claims. It is submitted, therefore, that the blending principle and advantages of the claimed invention are nonobvious in view of the cited JP reference.

Furthermore, the Examiner incorrectly states that claim 1 admits that the blending of softened water with untreated water is conventional in the art. Claim 1, as originally filed, is admittedly a Jepson-type claim. However, the preamble elements in Jepson-type claims "are impliedly admitted to be old in the art, ... but it is only an implied admission." *In re Ehrreich*, 590 F.2d 902, 909-910, 210 USPQ 504, 510 (CCPA 1979) (emphasis in original)(citations

omitted). In this regard, the Examiner's attention is directed to M.P.E.P. §2129 ("Admissions as Prior Art").

In view of implied nature of the admission, there must be a statutory basis to establish that the subject matter of the Jepson-preamble was invented by another before Applicant's invention. For the reasons previously stated, the cited JP reference does not disclose or suggest the claimed invention. Therefore, the JP reference fails does not provide a statutory basis for a claim rejection under 35 U.S.C. §102 or §103.

Moreover, as stated in M.P.E.P. §2129, a Jepson-preamble is not prior art if it describes the inventor's own work. Thus, in the present case, the Jepson-preamble of claim 1 cannot be used against the Applicant unless the subject matter of the preamble appeared in a publication or other public disclosure prior to the critical date of Applicant's invention.

Accordingly, for all of the foregoing reasons, it is submitted that the §103 rejections are improper. The cited JP reference does not suggest the blending of different streams of water of relatively higher and lower degrees of softness to form a variable feed to a desalination unit to obtain an advantageous improvement in cost-efficiency and yield. The Examiner's comments appearing on page 3 of the Office Action in support of the rejection are based upon hindsight reasoning in view of Applicant's disclosure. Moreover, the Examiner has not been able to provide a statutory basis establishing a prior art effect of the Jepson-preamble of claim 1. In any event, the expression "an improved" has been deleted from independent claims 1 and 24 to be consistent with Applicant's arguments and to clarify the novel and nonobvious elements of the claimed invention.

For all of the foregoing reasons, withdrawal of the §103 rejections is requested.

Claims 1, 2, 9, 10, 12-16, and 24-26 -Version With Markings to Show Changes Made:

1. A [An improved] desalination process to produce potable water which comprises:
 - (a) passing a first stream of [salt] water containing a high concentration of hardness ions through an ion selective membrane to form a softened [salt] water having a reduced content of hardness ions;
 - (b) blending the softened [salt] water with a second stream of [untreated salt] water containing a higher concentration of hardness ions than the softened water to form a feed to a desalination system; and
 - (c) introducing the feed to the desalination system to form a water product of potable quality, wherein the [improvement comprises the introduction of a feed of variable] proportions of the softened and second stream of [untreated salt] water forming the feed to the desalination system are varied to increase the top operating temperature of the system and increase recovery of potable water.
2. The desalination process according to claim 1, wherein the softened [salt] water content of the feed is at least 5%.
9. The desalination process according to claim 8, wherein the first stream of [salt] water is subjected to a deaeration pre-treatment step after passing through a softening system comprised of one or more nanofiltration membranes.
10. The desalination process according to claim 9, wherein the first stream of [salt] water is pre-heated by the heat of a reject stream of the desalination system before deaeration.

12. The desalination process according to claim 11, wherein the ionic content and quantity of softened [salt] water varies with the operating pressure of the ion selective membrane.

13. The desalination process according to claim 1, wherein the softened [salt] water is stored in a buffer system.

14. The desalination process according to claim 13, wherein the softened [salt] water stored in the buffer system is blended with the second stream of [untreated salt] water to form the feed to the desalination system.

15. The desalination process according to claim 13, wherein the softened [salt] water stored in the buffer system is injected into the desalination system.

16. The desalination process according to claim 1, wherein the softened [salt] water is fed by a cluster system to two or more desalination systems and blended with the second [seawater] stream of each system.

24. A [An improved] desalination process which comprises:

(a) blending a first stream of softened [salt] water having a substantially reduced concentration of hardness ions with a second stream of [untreated salt] water containing a higher concentration of hardness ions than the softened water to form a feed to a desalination system, and

(b) passing the [feed through the desalination system to form a water product of potable quality, wherein the improvement comprises the introduction of a feed of variable] proportions of the softened and second stream of [untreated salt] water forming the feed to the desalination system

are varied to increase the top operating temperature of the system and increase recovery of potable water.

25. The desalination process of claim 24, wherein the stream of softened [salt] water is obtained by passing untreated [salt] water across an ion selective membrane to reduce the ionic content of the first stream.

26. The desalination process of claim 24, wherein the first stream of [softened salt] water is [brine containing water] produced by the desalination system, and wherein the [brine containing] water is selected from the group consisting of reject, blowdown and recycled brine.

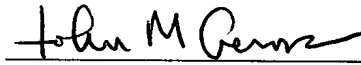
CONCLUSION

Upon entry of this Amendment, claims 1-18 and 24-29 are pending. Applicants respectfully submit that claims 1-18 and 24-29 are directed to patentable subject matter. Accordingly, Applicants request allowance of the claims.

Authorization is hereby given to charge any fee in connection with this communication to Deposit Account No. 23-1703.

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Respectfully submitted,



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Enclosures: Two sheets of drawings